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PATENT
MIT-094CP2CN

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: Shirley

SERIAL NUMBER: 10/721,148

GROUP NO.: 2877

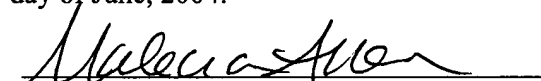
FILING DATE: November 25, 2003

EXAMINER: Smith, Zandra V.

TITLE: APPARATUS AND METHODS FOR SURFACE CONTOUR
MEASUREMENTS

CERTIFICATE OF FIRST CLASS MAILING UNDER 37 C.F.R. 1.8

I hereby certify that this correspondence, and any document(s) referred to as enclosed herein, is/are being deposited with the United States Postal Service as first class mail, postage prepaid, in an envelope addressed to Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 30th day of June, 2004.


Malecia Allen

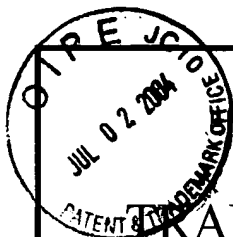
Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Submitted herewith is/are:

1. Transmittal Form (1 pg.);
2. Information Disclosure Statement (2 pgs.);
3. Form PTO-1449 (3 pgs.);
4. Response to Restriction Requirement (1 pg.); and
5. Return-Receipt Postcard.

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TRANSMITTAL FORM

| | |
|---------------------------|-------------------|
| Application Serial Number | 10/721,148 |
| Filing Date | November 25, 2003 |
| First Named Inventor | Shirley |
| Group Art Unit | 2877 |
| Examiner Name | Smith, Zandra V. |
| Attorney Docket No. | MIT-094CP2CN |
| Patent No. | Not applicable |
| Issue Date | Not applicable |

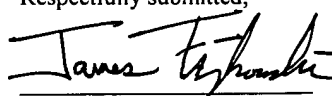
ENCLOSURES (check all that apply)

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| <input type="checkbox"/> Fee Transmittal Form <input type="checkbox"/> Check Attached <input type="checkbox"/> Copy of Fee Transmittal Form | <input type="checkbox"/> Copy of Notice to File Missing Parts of Application <input type="checkbox"/> Formal Drawing(s) <input type="checkbox"/> Request For Continued Examination (RCE) Transmittal <input type="checkbox"/> Power of Attorney (Revocation of Prior Powers) <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Executed Declaration and Power of Attorney for Utility or Design Patent Application <input type="checkbox"/> Small Entity Statement <input type="checkbox"/> CD(s) for large table or computer program <input type="checkbox"/> Amendment After Allowance <input type="checkbox"/> Request for Certificate of Correction <input type="checkbox"/> Certificate of Correction (in duplicate) | <input type="checkbox"/> Notice of Appeal to Board of Patent Appeals and Interferences <input type="checkbox"/> Appeal Brief (in triplicate) <input type="checkbox"/> Status Inquiry <input checked="" type="checkbox"/> Return Receipt Postcard <input checked="" type="checkbox"/> Certificate of First Class Mailing under 37 C.F.R. 1.8 <input type="checkbox"/> Certificate of Facsimile Transmission under 37 C.F.R. 1.8 <input checked="" type="checkbox"/> Additional Enclosure(s) (please identify below) <ul style="list-style-type: none">• Response to Restriction Requirement |
| <input type="checkbox"/> Amendment/Response <input type="checkbox"/> Preliminary <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Letter to Official Draftsperson including Drawings [Total Sheets ____] <input type="checkbox"/> Petition for Extension of Time <input checked="" type="checkbox"/> Information Disclosure Statement <input checked="" type="checkbox"/> Form PTO-1449 <input type="checkbox"/> Copies of IDS Citations <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Sequence Listing submission <input type="checkbox"/> Paper Copy/CD <input type="checkbox"/> Computer Readable Copy <input type="checkbox"/> Statement verifying identity of above | | |

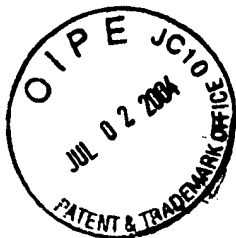
CORRESPONDENCE ADDRESS

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PATENT
MIT-094CP2CN

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT(S): Shirley
SERIAL NO.: 10/721,148 GROUP NO.: 2877
FILING DATE: November 25, 2003 EXAMINER: Smith, Zandra V.
TITLE: Apparatus and Methods for Surface Contour Measurements

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Sir:

In accordance with the provisions of 37 C.F.R. 1.97 and 1.98, Applicant hereby makes of record the patents and publications listed on the accompanying Form PTO-1449, and other information contained herein, for consideration by the Examiner in connection with the examination of the above-identified patent application. In accordance with the provisions of 37 C.F.R. § 1.98(d), copies of the references are not enclosed as these references were previously cited by or submitted to the U.S. Patent and Trademark Office in the parent application U.S.S.N. 09/480,043, and the prior application is relied upon for an earlier filing date under 35 U.S.C. § 120.

REMARKS

In accordance with the provisions of 37 C.F.R. 1.97, this statement is being filed (CHECK ONE):

- ☒ (1) within three (3) months of the **filing date** of a national application other than a continued prosecution application under 37 C.F.R. 1.53(d), or within three (3) months of the **date of entry of the national stage** as set forth in 37 C.F.R. 1.491 in an international application, or before the mailing of the **first Office action** on the merits, or before the mailing of a **first Office action** after the filing of a request for continued examination under 37 C.F.R. 1.114; or
- ☐ (2) after the period defined in (1) but before the mailing date of a **final action** or a **notice of allowance** under 37 C.F.R. 1.311, and
- ☐ the requisite Statement is below, **OR**

- ☐ the requisite fee under 37 C.F.R. 1.17(p), namely **\$180.00**, is included herein, or
- ☐ (3) after the mailing date of a **final action** or **notice of allowance** but before the payment of the **issue fee**, **AND**
- ☐ the requisite Statement is below, **AND**
- ☐ the requisite petition fee under 37 C.F.R. 1.17(p), namely **\$180.00** is included herein.

It is respectfully requested that each of the patents and publications listed on the attached Form PTO-1449, and other information contained herein, be made of record in this application.

STATEMENT

As required under 37 C.F.R. 1.97(e), Applicant(s), through the undersigned, hereby state either that

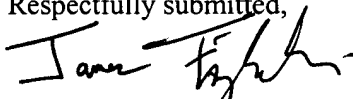
- ☐ 1. Each item of information contained in the Information Disclosure Statement was first cited in any communication from a foreign patent office in a counterpart foreign application **not more than three months** prior to the filing of the Information Disclosure Statement; or
- ☐ 2. No item of information contained in the Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing this Statement after making reasonable inquiry, no item of information contained in the Information Disclosure Statement was known to **any individual** designated in 37 C.F.R. 1.56(c) **more than three months** prior to the filing of the Information Disclosure Statement.

Date: June 30, 2004
Reg. No. 54,089

Tel. No.: (617) 310-8414
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3064354

Respectfully submitted,



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FORM PTO - 1449

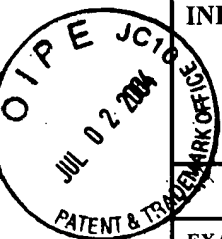
INFORMATION DISCLOSURE STATEMENT

ATTORNEY DOCKET NO.: MIT-094CP2CN (5473/101)

APPLICANT(S): Shirley

SERIAL NO.: 10/721,148

FILING DATE: November 25, 2003 GROUP: 2877



U.S. PATENT DOCUMENTS

| EXAM. INIT. | | DOCUMENT NUMBER | DATE | NAME | CLASS | SUB CLASS | FILING DATE IF APPROPRIATE |
|-------------|-----|-----------------|----------|-----------------|-------|-----------|----------------------------|
| | A1 | 2001/0012388 A1 | 08/09/01 | Muller et al. | | | 03/04/98 |
| | A2 | 3,994,589 | 11/30/76 | Nodwell et al. | | | 04/18/82 |
| | A3 | 4,139,304 | 02-13-79 | Redman, et al. | 356 | 358 | 02-10-77 |
| | A4 | 4,298,286 | 11-03-81 | Maxey et al. | 356 | 381 | 06-02-80 |
| | A5 | 4,349,277 | 09-14-82 | Mundy, et al. | 356 | 376 | 06-11-80 |
| | A6 | 4,499,492 | 02-12-85 | Hutchin | 358 | 107 | 02-07-83 |
| | A7 | 4,781,455 | 11-01-88 | Mächler, et al. | 356 | 34 | 05-08-86 |
| | A8 | 4,832,489 | 05-23-89 | Wyant, et al. | 356 | 359 | 03-19-86 |
| | A9 | 5,146,293 | 09-08-92 | Mercer, et al. | 356 | 356 | 05-13-91 |
| | A10 | 5,289,264 | 02-22-94 | Steinbichler | 356 | 376 | 09-25-92 |
| | A11 | 5,455,670 | 10-03-95 | Payne, et al. | 356 | 5.1 | 05-27-93 |
| | A12 | 5,621,529 | 04-15-97 | Gordon et al. | 356 | 376 | 04-05-95 |
| | A13 | 5,666,197 | 08-09-97 | Guerra | 356 | 359 | 08-21-96 |
| | A14 | 6,049,384 | 04-11-00 | Rudd et al. | 356 | 376 | 03-18-97 |
| | A15 | 6,438,272 | 08-20-02 | Huang et al. | 382 | 286 | 12-31-98 |

FOREIGN PATENT DOCUMENTS

| EXAM. INIT. | | DOCUMENT NUMBER | DATE | COUNTRY CODE | CLASS | SUB CLASS | FILING DATE | ABSTRACT ONLY | ENGLISH LANG (Y/N) |
|-------------|----|-----------------|----------|--------------|-------|-----------|-------------|---------------|---------------------------|
| | B1 | 2554086 | 06-16-77 | DE | | | 12-02-75 | No | Abstract - Yes |
| | B2 | 2142427A | 01-16-85 | GB | | | 05-21-84 | No | Yes |
| | B3 | 61198009 | 09-02-86 | JP | | | 02-28-85 | Yes | Yes |
| | B4 | 58173412 | 10-12-83 | JP | | | 04-05-82 | Yes | Yes |
| | B5 | 97/29341 | 08-14-97 | PCT | | | 02-03-97 | No | Yes |
| | B6 | 28 50 092 A1 | 05/29/80 | DE | | | 11/18/78 | No | No Abstract in English |

EXAMINER

DATE CONSIDERED

| FORM PTO - 1449 | | | | | ATTORNEY DOCKET NO.: MIT-094CP2CN (5473/101) | | | | |
|------------------------------------------|-----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------|-----------------------------------------------------|-----------|-------------|---------------|---------------------------|
| INFORMATION DISCLOSURE STATEMENT | | | | | APPLICANT(S): Shirley | | | | |
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| EXAM. INIT. | | DOCUMENT NUMBER | DATE | COUNTRY CODE | CLASS | SUB CLASS | FILING DATE | ABSTRACT ONLY | ENGLISH LANG (Y/N) |
| | B7 | 44 04 663 A1 | 08/17/95 | DE | | | 02/14/94 | No | No Abstract in English |
| | B8 | 0 864 847 A2 | 09/16/98 | EP | | | 03/05/98 | No | No Abstract in English |
| | B9 | 0 864 847 A3 | 09/16/98 | EP | | | 03/05/98 | No | No Abstract in English |
| | B10 | 2 595 815 | 09/18/87 | FR | | | 03/17/86 | No | No Abstract in English |
| OTHER ART, JOURNAL ARTICLES, ETC. | | | | | | | | | |
| EXAM. INIT. | OTHER DOCUMENTS: (Including Author, Title, Date, Relevant Pages, Place of Publication) | | | | | | | | |
| | C1 | Butters, Von J. N., "Using the Laser to Measure Length," <i>Materialprüf</i> , 24:245-248 (July 7, 1982) (German Abstract). | | | | | | | |
| | C2 | Zou <i>et al.</i> , "Two-Wavelength DSPI Surface Contouring Through the Temperature Modulation of a Laser Diode," <i>Optik</i> , 94(4):155-158 (1993). | | | | | | | |
| | C3 | Peng <i>et al.</i> , "A Simplified Multi-Wavelength ESPI Contouring Technique Based on a Diode Laser System," <i>Optik</i> , 91(2):81-85 (1992). | | | | | | | |
| | C4 | Fercher <i>et al.</i> , "Two-Wavelength Speckle Interferometric Technique for Rough Face Contour Measurement," <i>Optical Engineering</i> , 25(5):623-626 (May 1986). | | | | | | | |
| | C5 | Fercher <i>et al.</i> , "Rough Surface Interferometry with a Two-Wavelength Heterodyne Speckle Interferometer," <i>Applied Optics</i> , 24(14):2181-1288 (July 15, 1985). | | | | | | | |
| | C6 | Thalman <i>et al.</i> , "Dimensional Profiling by Electronic Phase Measurement," <i>SPIE Industrial Laser Interferometry</i> , 746:61-68 (1987). | | | | | | | |
| | C7 | Takeda <i>et al.</i> , "Fourier-Transform Speckle Profilometry: Three-Dimensional Shape Measurements of Diffuse Objects with Large Height Steps and/or Spatially Isolated Surfaces," <i>Applied Optics</i> , 33(34):7829-7837 (December 1, 1994). | | | | | | | |
| | C8 | Volotovskaya, N.K., "Relationship Between the Frequency and Angular Correlation Function of a Signal that is Scattered by an Extensive Body," <i>Radio Engineering and Electronic Physics J.</i> 16(6):1048-1049 (June 1971). | | | | | | | |
| EXAMINER | | | | | DATE CONSIDERED | | | | |

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|-----------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| FORM PTO - 1449 | | ATTORNEY DOCKET NO.: MIT-094CP2CN (5473/101) | |
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| EXAM. INIT. | OTHER DOCUMENTS: (Including Author, Title, Date, Relevant Pages, Place of Publication) | | |
| | C9 | Dresel <i>et al.</i> , "Three-Dimensional Sensing of Rough Surfaces by Coherence Radar," <i>Applied Optics</i> , 31(7):919-925 (March 1, 1992). | |
| | C10 | Shirley <i>et al.</i> , "Advanced Techniques for Target Discrimination Using Laser Speckle," <i>Massachusetts Institute of Technology, The Lincoln Laboratory J.</i> , 5(3):367-440 (1992). | |
| | C11 | Shirley, L. G., "Applications of Tunable Lasers to Laser Radar and 3D Imaging," <i>Technical Report 1025, Massachusetts Institute of Technology, Lincoln Laboratory</i> , (1995). | |
| | C12 | K. Creath, "Phase-measurement interferometry techniques," <i>Chap. 5 in Progress in Optics XXVI</i> , E. Wolf Ed. pp. 349-393, Elsevier Science Publishers, New York, NY (1988). | |
| | C13 | G.T. Reid, R.C. Rixon, and H.I. Messer, "Absolute and comparative measurements of three-dimensional shape by phase measuring moire topography," <i>Optics and Laser Technology</i> , 315-319, December, (1984). | |
| | C14 | G. Indebetouw, "Profile measurement using projection of running fringes," <i>Applied Optics</i> , 17(18), 2930-2933 (1978). | |
| | C15 | V. Srinivasan, H.C. Liu, and M. Halioua, "Automated phase-measuring profilometry of 3-D diffuse objects," <i>Applied Optics</i> , 23(18), 3105-3108 (1984). | |
| | C16 | L.S. Wang, B.N. Dobbins, K. Jambunathan, and X.P. Wu, "Fibre optic shape measuring system using phase stepping speckle pattern interferometry," <i>SPIE</i> , 2088, MJ. Downs Ed., pp. 104-110 (1993). | |
| | C17 | L.H. Bieman, "Absolute measurement using field shifted moire," <i>SPIE</i> , 1614, 259-264 (1991). | |
| | C18 | H.O. Saldner and J.M. Huntley, "Temporal phase unwrapping: application to surface profiling of discontinuous objects," <i>Applied Optics</i> , 36(13), 2770-2775 (1997). | |
| | C19 | K. Creath, "Phase-shifting speckle interferometry," <i>Applied Optics</i> , Vol. 24, No. 18, (1985). | |
| | C20 | J.M Huntley and H.O. Saldner, "Shape measurement by temporal phase unwrapping and spatial light modulator-based fringe projector," <i>SPIE</i> , Vol. 3100, 185-192, (1997). | |
| | C21 | R.W. Wygant, S.P. Almeida, O.D.D. Soares, "Surface inspection via projection interferometry," <i>Applied Optics</i> , Vol. 27, No. 22, (1988). | |
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| EXAMINER | | DATE CONSIDERED | |